PROCAMBARUS (GIRARDIELLA) CURDI, A NEW CRAWFISH FROM ARKANSAS, OKLAHOMA, AND TEXAS (DECAPODA, ASTACIDAE)[1]

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ABSTRACT

Procambarus (*Girardiella*) ***curdi*** is described from material collected in the Red River drainage of Arkansas and Oklahoma and the Brazos River drainage of Texas. Its closest affinities are with *Procambarus simulans simulans* (Faxon) which occurs in the same drainage systems.

While working on the crawfishes of Arkansas in 1961–1963 (Reimer, 1964), some crawfishes were collected among which were individuals similar to, yet quite distinct from *Procambarus simulans simulans* (Faxon, 1884). At the time, only a limited area of the range of *Procambarus s. simulans* was examined. When a thorough study of the subgenus *Girardiella* was undertaken (Reimer, 1969a) these individuals were recognized as representing a distinct species with an interesting distribution in Arkansas, Oklahoma, and Texas. *Procambarus curdi* represents the sixth taxon to be assigned to the subgenus *Girardiella.*

Procambarus (*Girardiella*) ***curdi*** new species (Figures 1–9)

Cambarus simulans.—Creaser and Ortenburger 1933:42, Fig. 18 (in part).

Procambarus simulans simulans.—Reimer 1964:28 (in part), 1969b:56 (in part).

Procambarus A Reimer and Clark, Southwestern Naturalist (in press).

Diagnosis. Rostrum without lateral spines, acumen reduced; areola narrow with two rows of punctations at narrowest part; postorbital ridges terminating cephalically without spine; cervical spine absent or reduced to small tubercle; brachiostegal spine reduced; suborbital angle reduced; antennal scale widest at mid-length; palm of chela without beard. First pleopod of Form I male reaching coxopodite of third pereiopod and terminating in four distinct parts: mesial process noncorneous, subspiculiform, extending beyond other terminal elements; cephalic process noncorneous, small; caudal process, truncate; lamellated part of caudal process corneous flattened lateromesially, narrow, distal margin rounded; central projection corneous, large, subtriangular, flattened lateromesially, slightly longer than caudal process. Cephalic shoulder rounded. Annulus ventralis subovate; cephalic half with broad V-shaped trough, bordered laterally by tuberculate prominences; sinus originating at mid-ventral line, running sinistrad, forming sharp arc on sinistral half, running dextrad to midline, bending caudally, terminating before reaching caudal margin.

Holotypic Male, Form I. Body ovate. Abdomen narrower, longer (14.9, 34.5 mm) than thorax (19.9, 14.1 mm). Cephalic section of telson with four spines in each caudolateral corner, outer spine longest. Width, depth of carapace subequal in region of caudodorsal margin of cervical groove.

Areola narrow (15.7 times longer than wide) two rows of punctations in narrowest part; sides parallel for short distance. Cephalic section of carapace 1.7 times as long as areola (length of areola 36.8% of entire length of carapace).

Rostrum excavate above, sides slightly convergent, cephalic shoulders broadly rounded, acumen reduced, reaching almost to distal border of penultimate segment of peduncle of antennule.

[1] A contribution of the Department of Wildlife and Fisheries Sciences, Texas, Agricultural Experiment Station, Texas A & M University.

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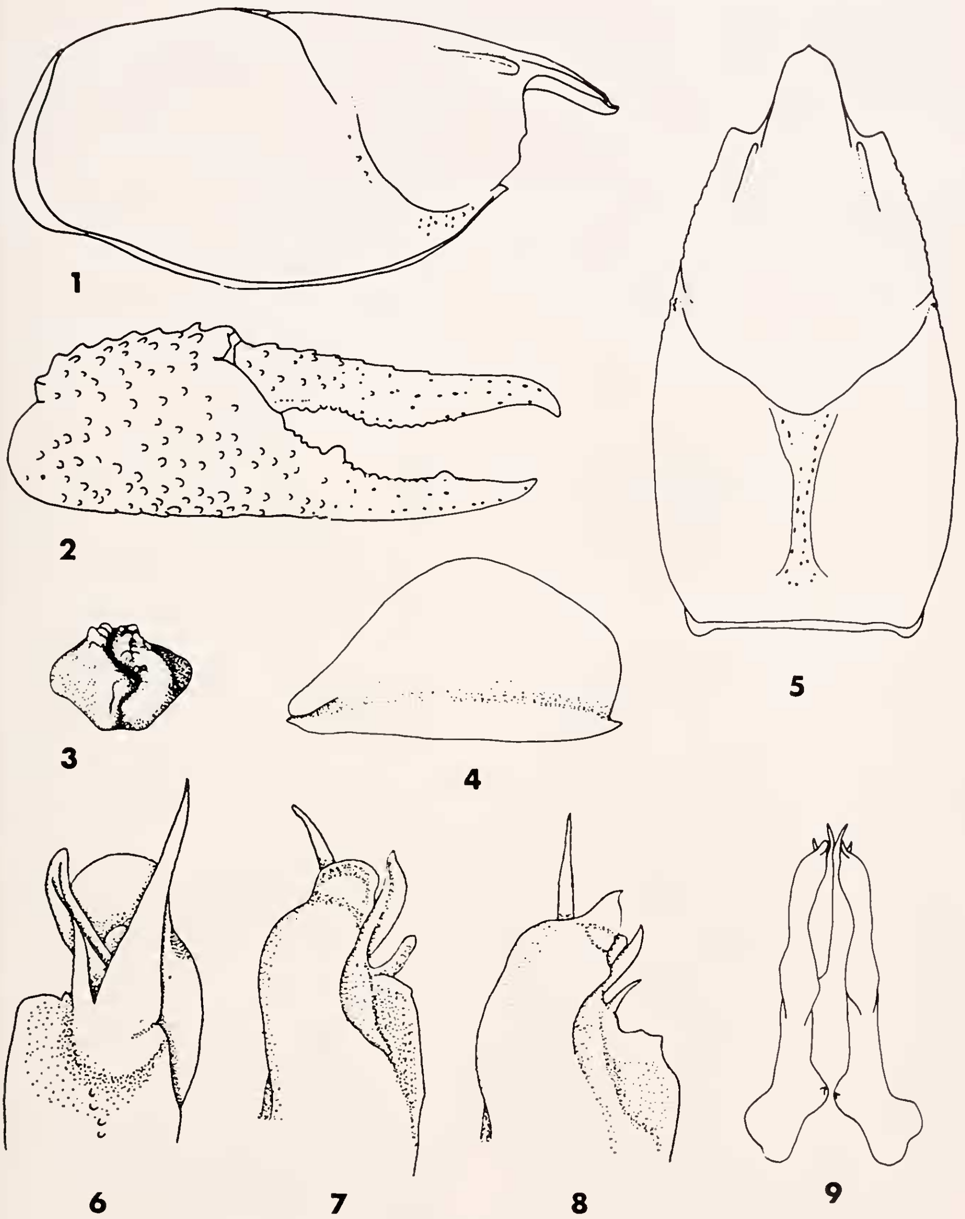

Figures 1–9. Figures 1–7, 9 paratypic *Procambarus curdi* n. sp.: 1, lateral view of cephalothorax; 2, dorsal view of right chela; 3, annulus ventralis of female; 4, antennal scale; 5, dorsal view of cephalothorax; 6, mesial view of terminal elements of first pleopod of Form I male; 7, lateral view of terminal elements of first pleopod of Form I male; 9, ventral view of first pleopods of male. Figure 8, lateral view of terminal elements of first pleopod of Form I male, *P. s. simulans*.

Postorbital ridges well defined, merging rather abruptly cephalad into carapace, without spine or tubercle. Suborbital angle reduced, rounded; branchiostegal spine slightly reduced. Surface of carapace punctate dorsally, granulate laterally. Epistome broadly subovate; lateral borders raised; cephalic margin with three emarginations.

Antennule of usual form; spine present on ventromesial side of basal segment. Antennae reaching fourth abdominal segment. Antennal scale broad, broadest at mid-length; inner margin angular.

Chela subcylindrical, long. Inner surface of palm tuberculate, rest of surface covered with punctations; palm without beard. Fingers slightly gaping. Opposable margin of dactyl with row of 16 (13 on left) rounded tubercles, denticles along distal half; upper surface with row of tubercles along proximal half. Opposable margin of immovable finger with 13 (14 on left) rounded tubercles, minute denticles scattered along entire length.

Carpus of first pereiopod longer than wide (11.7–8.0 mm); subequal in length to that of inner margin of palm of chela (11.1 mm); shallow, longitudinal groove above; dorsomesial and mesial surfaces tuberculate, otherwise sparsely punctate. Six larger tubercles along distomesial margin, few reduced tubercles along mesial surface.

Merus of first pereiopod slightly punctate mesially and laterally; few tubercles scattered along dorsal surface, more numerous distally; lower surface with two rows of tubercles, outer row of 10 smaller than inner row of 17, most spike-like; two spines along distoventral border; few reduced tubercles on ventral surface between margins.

Hooks present on ischiopodites of third pereiopods. First pleopod reaching base of third pereiopod when abdomen flexed; terminal portion of appendage without setae on cephalic surface. Appendage ending in four distinct parts. Mesial process subspiculiform, noncorneous, extending beyond other terminal elements, bent slightly laterally. Cephalic process small, noncorneous, arising from mesial surface, directed slightly cephalically. Caudal process truncate, corneous, making up caudolateral portion of tip; lamellated part of caudal process flattened lateromesially, narrow, distal margin rounded, slightly cupped, cup opening laterally; adventitious process absent; caudal hump prominent. Central projection large, corneous, subtriangular, flattened lateromesially, slightly longer than caudal process, bent slightly laterally. Cephalodistal shoulder rounded.

Allotypic female. The annulus ventralis is subovate. A broad V-shaped trough extends down the cephalic half bordered by tuberculate elevations laterally. The sinus originates cephalically on the median line and extends sinistrally before forming a sharp arc on the sinistral half. It then runs to the mid-line, before bending caudally. It terminates just before reaching the caudal margin.

Measurements (in millimeters). Male (Form I) Holotype: Carapace, height 18.1, width 19.9, length 38.3; areola, width 0.9, length 14.1; rostrum, width 5.4, length 7.2; abdomen, width 14.9, length 34.5; right chela length of inner margin of palm 11.1, width of palm 12.7, length of outer margin of hand 33.5, length of movable finger 21.5. Female Allotype: carapace, height 16.3, width 17.1, length 32.9; areola, width 0.8, length 11.8; rostrum, width 4.3, length 6.9; abdomen, width 13.7, length 32.9; chelae missing.

Type locality. Navasota River, NE of Bryan on U.S. Highway 190, Brazos County, Texas. The holotype and allotype were collected by the author on 2 June 1968.

The types were collected from burrows on the west bank of the River below the bridge. Recent rains had formed shallow pools some distance from the main river basin, which was overflowing. The crawfish were from around these pools. The burrows had only one opening and descended at an angle to an unknown depth. The crawfish were all taken at a depth of about two feet. Some of the burrows were capped with chimneys up to five inches in height.

Approximately four or five feet to the east of where *Procambarus curdi* was taken, there was a very heavy growth of grass, and immature *Fallicambarus hedgpethi* (Hobbs, 1948) were taken from small pot holes made by car and tractor wheels. No burrows were observed in this area, however, and *F. hedgpethi* was not collected from around or in the pools under the bridge.

Disposition of types. The holotypic male and allotypic female (Nos. 144350 and 144351, respectively) are deposited in the National Museum of Natural History (Smithsonian Institution). All paratypes have been placed in the author's private collection.

Relationships. In 1972, Hobbs reviewed the genus *Procambarus* and erected subgenera for various Groups and Sections within the genus. The members of the Section Gracilis Ortmann, 1905, which includes *Procambarus s. simulans*; *Procambarus s. regiomontanus* Villalobos, 1954; *Procambarus tulanei* Penn, 1953; *Procambarus gracilis* (Bundy, 1876); and *Procambarus hagenianus* (Faxon, 1884), were placed in the subgenus *Girardiella*, proposed by Lyle in 1938. *Procambarus curdi* seems to have its closest affinities with *P. s. simulans*, *P. s. regiomontanus* and *P. tulanei*, sharing with them the same body conformity but differing in the shape of the rostrum, antennal scale and gonopod. The width-length ratio of the antennal scale as well as the rostrum is less in *P. curdi* than in the above species and the distal spine of the antennal scale and rostrum (acumen) is usually more reduced. The lamellated part of the caudal process is flattened lateromesially in *P. curdi* rather than cephalocaudally as in *P. s. simulans*. The caudal process is strongly bent caudally in *P. curdi* (as in *P. s. simulans*) rather than straight or only slightly bent as in *P. tulanei* and *P. s. regiomontanus*.

Within the subgenus *Girardiella*, *P. gracilis* and *P. hagenianus* seem to be only distantly related to *P. curdi*. The body, rostrum and antennal scale are more reduced and the cephalothorax is neither spiny nor tuberculate as it is in *P. curdi*. Too, the chelipeds of *P. gracilis* and *P. hagenianus* are shorter, broader and more compressed than in *P. curdi*. The position of the terminal elements of the gonopod of *P. hagenianus* resembles somewhat the condition found in *P. curdi* in that the lamellated part of the caudal process is flattened lateromesially in both. However, the cephalic process is absent in *P. hagenianus* and the differences in the general body form of the two shows that the cephalic process is not an indication of a close relationship. The terminal elements of *P. gracilis* are more reduced than in *P. curdi*.

The areola, being narrow in *P. curdi*, can be used to distinguish it from *P. gracilis* and *P. hagenianus* which have a closed areola and *P. tulanei* with a wide areola.

Specimens examined. ARKANSAS: *Little River County*—12.5 mi. W. of Ashdown. OKLAHOMA: *Bryan County*—Durant Fish Hatchery at Armstrong. *Choctaw County*—0.4 mi. W. of Swink on U.S. Hy. 70. *Kiowa County*. *McCurtain County*—Small Drain N of Idabel High School; Airport pond NE of Idabel; 0.5 mi. S, 0.25 mi. W of Idabel; Railroad pond S of Idabel. TEXAS: *Brazos County*—Navasota River basin; small drainage creek, SE city limits of Bryan at St. Hy. 6. *Grimes County*—Thomas Cr. S of Anderson.

The collection from Kiowa County, Oklahoma was first reported by Creaser and Ortenburger in 1933. The only label with the collection reads "Kiowa County," and the exact locality for this collection cannot be determined.

Etymology. This species is named in honor of Milton Curd of Oklahoma State University, Stillwater, Oklahoma.

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